Measuring Urban Environmental Quality

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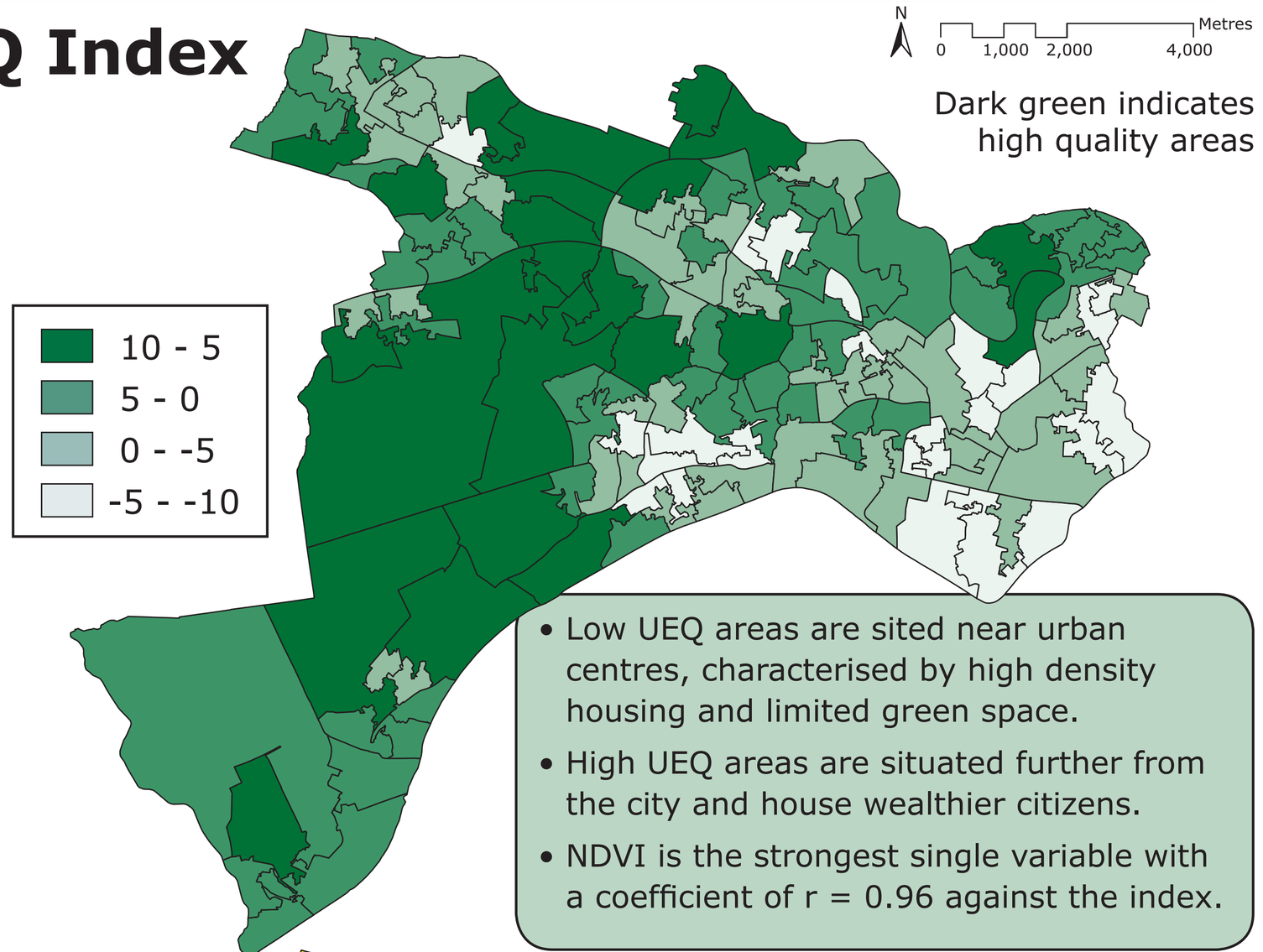
Introduction

This study examines whether physical characteristics of the Salford landscape can be used to quantitatively measure Urban Environmental Quality (UEQ) to create a scientific method of grading and comparing the environmental quality of different areas of land.

Part I: Creating the UEQ Index

There is no single measure for UEQ. Therefore, seven secondary variables are collected using a Geographic Information System (GIS) and remote sensing technology, analysed and merged together using Principal Component Analysis to create a single UEQ index.

Variables used	Reason
Normalised Difference Vegetation Index (NDVI)	Provide general pattern of landscape
Normalised Difference Built-up Index (NDBI)	
Buildings Area	Provide more detailed information on urban shape, size and form
Building Volume	
Building Height	
Surface Temperature	Common variables in literature
Distance from Water	

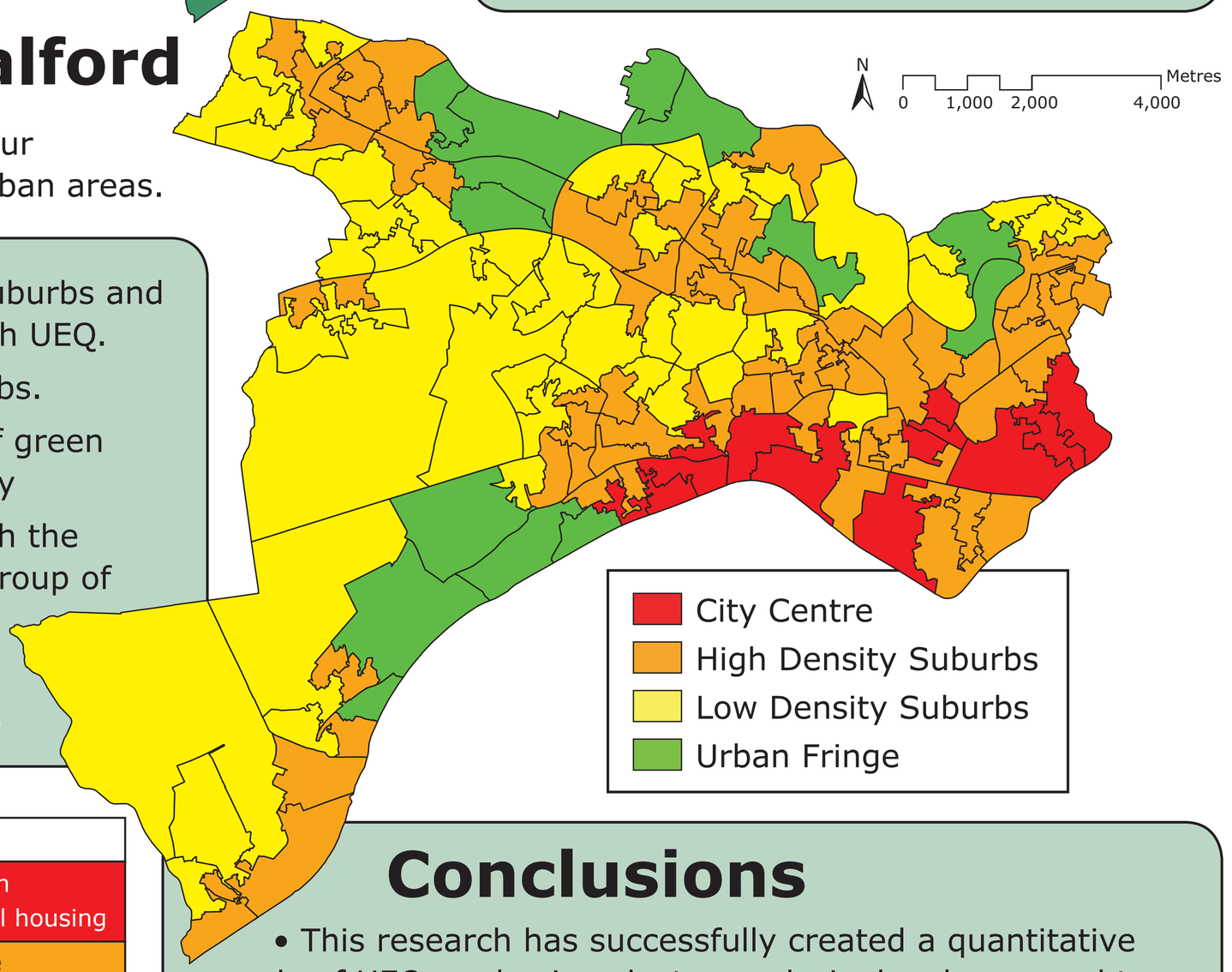


- Low UEQ areas are sited near urban centres, characterised by high density housing and limited green space.
- High UEQ areas are situated further from the city and house wealthier citizens.
- NDVI is the strongest single variable with a coefficient of r = 0.96 against the index.

Part II: Characterising Salford

By collecting areas with similarly patterned variables, four clusters were formed and characterised into different urban areas.

- There is a high association between High Density Suburbs and low UEQ and between Low Density Suburbs and High UEQ.
- The wealthiest people live in the Low Density Suburbs.
- Although Urban Fringe has the highest proportion of green space, it generally homes poorer members of society
- The City Centre has a low average UEQ and although the majority of the population is poor, there is a small group of rich young professionals living here.
- The positive relationship between high UEQ and residents wealth is strong, but there are exceptions.



	Most represented Experian MOSAIC Groups
City Centre	Urban Intelligence - young, educated, cosmopolitan Welfare Borderline - on benefits, struggling, council housing
High Density Suburbs	Ties of the Community - working class, responsible Welfare Borderline - on benefits, struggling, council housing Municipal Dependency - low income, low aspirations
Low Density Suburbs	Happy Families - career, home, family Ties of the Community - working class, responsible Municipal Dependency - low income, low aspirations
Urban Fringe	Suburban Comfort - successful, few burdens, family Ties of the Community - working class, responsible Municipal Dependency - low income, low aspirations

Conclusions

- This research has successfully created a quantitative scale of UEQ, and using cluster analysis, has been used to classify Salford into distinct urban areas.
- Super Output Areas are appropriate for integrating socio-economic datasets, but they do have known limitations and further exploration is required.
- Integration with classification systems such as MOSAIC or OAC to build a more comprehensive quantitative measure of UEQ.

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